PATENT
Docket 13DV-13913

DW

AF

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: M.S. Lamphere et al

Art Unit: 1742

Application No.: 09/994,342
Confirmation No: 9845

Examiner: Wilkins, H.

Filed: 11/26/2001

Title: **Tandem Blisk Electrochemical Machining**

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES
TRANSMITTAL OF APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In accordance with 37 CFR 41.31, applicants hereby appeal to the Board of Patent Appeals and Interferences from the final decision of the examiner dated 05/23/2005, finally rejecting claims 1-20.

In accordance with 37 CFR 41.37, applicants herewith enclose an Appeal Brief.

Please charge the $500.00 fee for filing a Brief in support of Appeal, in accordance with 37 CFR 41.20(b)(2), to Deposit Account No. 07-0865 of General Electric Company in accordance with the attached Fee Transmittal.

Respectfully submitted,

Date: 22 Aug 2005

Francis L. Conte, Attorney
Registration No. 29,630

6 Puritan Avenue
Swampscott, MA 01907
Tel: 781-592-9077; Fax: 781-592-4618

Attachment: One-page Fee Transmittal for FY 2005

CERTIFICATE OF MAILING (37 CFR 1.8a)

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to the: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

FRANCIS L. CONTE — 22 August 2005
(Name of person mailing paper) (Signature of person mailing paper) (Date)

PTO/SB/17 (12-04v2)
Approved for use through 07/31/2006. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Effective on 12/08/2004.
Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).

FEE TRANSMITTAL For FY 2005

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($) 500

Complete If Known	
Application Number	09/994,342
Filing Date	11/26/2001
First Named Inventor	M.S. Lamphere et al
Examiner Name	Wilkins, H.
Art Unit	1742
Attorney Docket No.	13DV-13913

METHOD OF PAYMENT (check all that apply)

☐ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): _____

☑ Deposit Account Deposit Account Number: 07-0865 Deposit Account Name: General Electric Company

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☑ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, except for the filing fee

☑ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17 ☑ Credit any overpayments

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

Application Type	FILING FEES Fee ($)	FILING FEES Small Entity Fee ($)	SEARCH FEES Fee ($)	SEARCH FEES Small Entity Fee ($)	EXAMINATION FEES Fee ($)	EXAMINATION FEES Small Entity Fee ($)	Fees Paid ($)
Utility	300	150	500	250	200	100	
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description	Fee ($)	Small Entity Fee ($)
Each claim over 20 (including Reissues)	50	25
Each independent claim over 3 (including Reissues)	200	100
Multiple dependent claims	360	180

Total Claims _____ - 20 or HP = _____ x Fee ($) 50 = Fee Paid ($) 0

HP = highest number of total claims paid for, if greater than 20.

Indep. Claims _____ - 3 or HP = _____ x Fee ($) 200 = Fee Paid ($) 0

HP = highest number of independent claims paid for, if greater than 3.

Multiple Dependent Claims Fee ($) _____ Fee Paid ($) _____

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

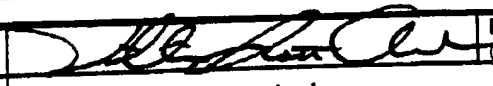
Total Sheets _____ - 100 = _____ / 50 = _____ (round up to a whole number) x Fee ($) _____ = Fee Paid ($) _____

4. OTHER FEE(S)

Non-English Specification, $130 fee (no small entity discount)

Other (e.g., late filing surcharge): Appeal Brief (1402) Fees Paid ($) 500

SUBMITTED BY

Signature		Registration No. (Attorney/Agent) 33,582	Telephone 513-243-5955
Name (Print/Type)	William Scott Andes		Date 22 August 2005

PATENT
Docket 13DV-13913

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: M.S. Lamphere et al

Art Unit: 1742

Application No.: 09/994,342
Confirmation No: 9845

Examiner: Wilkins, H.

Filed: 11/26/2001

Title: **Tandem Blisk Electrochemical Machining**

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In accordance with 37 CFR 41.37, applicants hereby submit this Appeal Brief and request that the decision of the examiner dated 05/23/2005 finally rejecting claims 1-20 be reversed and that these claims be allowed.

CERTIFICATE OF MAILING (37 CFR 1.8a)

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to the: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

FRANCIS L. CONTE — 22 August 2005
(Name of person mailing paper) (Signature of person mailing paper) (Date)

REAL PARTY IN INTEREST

The real party in interest is the assignee, General Electric Company.

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

STATUS OF CLAIMS

Claims 1-20 stand pending in the application.

No claims have been canceled.

Claims 1-20 stand finally rejected and are the subject of this Appeal Brief.

STATUS OF AMENDMENTS

There is no amendment filed subsequent to the final rejection.

INTERVIEW SUMMARY

On 07/19/2005, the undersigned attorney conducted a phone interview with examiner Wilkins to discuss the rejections of record and the applied references, but no agreement was reached.

The final office action is the fourth action on the merits of the original claims, with substantially no substantive amendments being made thereto.

The examiner indicated, following concurrence with his supervisor, that the present rejections would stand as written, making necessary this present appeal.

This, notwithstanding the continued traverse of the rejections, and the discovery that the First National City Bank case cited by the examiner at page 9 of the office action is related to trademarks and has no relevance to obviousness rejections under patent law.

In the examiner's interview summary dated 08/02/2005, the examiner has substituted the General Foods Corp. case for the First National City Bank case.

It is noted that the cited case does not appear to be found in the MPEP, and according to the examiner that case was found in an independent listing of cases used in the examiner's group.

The inappropriateness of that case is addressed in the main brief.

BACKGROUND

A gas turbine engine includes several rows of rotor blades extending outwardly from a rotor disk. The blades are individually machined either with integral dovetails for mating with the disk perimeter, or in a unitary construction therewith known as a blisk.

The blisk construction enjoys performance advantages in the engine, yet requires special manufacture thereof. Since the blisk includes a full row or complement of rotor blades, damage to any one of the many blades during the manufacturing process must be carefully avoided since the manufacture of even one unacceptable blade renders the entire blisk unacceptable leading to the scrapping thereof at considerable expense in material and manufacturing cost.

The blades in a blisk have camber, twist, and solidity selected for maximizing aerodynamic performance. However, high camber, high twist, and high solidity create substantial problems for the manufacture of the blisk either by conventional machining or by electrochemical machining (ECM).

The primary reference, US Patent 4,851,090 - Bruns et al, being applied by the examiner is specifically identified at para. 8 in the Background section for its advantages and disadvantages.

The Bruns patent discloses and claims a method and apparatus for electrochemically machining blisk blades. A pair of electrode tools conforming to the desired configurations of the pressure and suction sides of the individual blades are both translated and collectively rotated during ECM as a liquid electrolyte flows between the blade and tools. The blade forms an anode and the tools form cathodes provided with high electrical current for electrochemically machining the blade to the desired final dimensions thereof by surface erosion of the metal.

The blisk is mounted on a spindle which is rotated during operation to index individual blades between the tool

pair, with the individual blade also being translated with the spindle for moving inwardly between the electrode tools.

In this way, the compound movement of the electrode tools and the blade are used for electrochemical machining the individual blades in sequence for achieving the desired aerodynamic contours thereof, including camber and twist for the full row of blades on the supporting disk.

However, the ECM machine necessarily requires suitable setup. The blisk requires a fixture for mounting it to the machine spindle. The electrode tools must be correspondingly mounted to the supporting rotary head of the machine for independent translation thereof and collective rotation.

In view of the precision requirements for the final blisk dimensions down to about a few mils or even less than one mil, an elaborate setup procedure is required to ensure precise machining of the production blisk. Either the production blisk itself, or a scrap blisk may be used as an initial sample loaded into the machine for machining one or more sample blades thereon. The sample must then be removed from the machine and inspected to accurately determine the dimensions thereof, which are then compared with the desired final dimensions for the blades.

The setup procedure is typically effected with incremental machining of the sample blades to avoid excessive machining thereof which would render the blade out-of-specification, and therefore unacceptable. Accordingly, the setup procedure is normally repeated several times to incrementally machine the sample blades, and correspondingly adjust tool mounting, blisk fixturing, or datum offsets for the CNC program as required to ensure proper alignment of the blisk in the machine, proper alignment of the electrode tools on their supporting head, and proper machining of the individual blisk blades.

When the setup procedure is finally completed, the production blisk may then be mounted in the machine in the same manner as the sample blisk, and without changing the

mounting of the electrode tools or alignment of the various components of the machine. The production blisk may then be electrochemically machined blade-by-blade in sequence to the precise tolerances required by the corresponding drawing specifications therefor.

The manufacture of gas turbine engine blisks is made even more complex for tandem blisks. A tandem blisk includes two rows or stages of rotor blades extending radially outwardly from corresponding supporting disks, all of which are integrally joined together in a unitary or one-piece part. The two stages have correspondingly different configurations for the required aerodynamic performance thereof.

Accordingly, different electrode tools are required for the different blisk stages, and corresponding setup of the ECM machine is required for machining each of the two stages of the tandem blisk.

The ECM machine described in the Bruns patent has been used to manufacture tandem blisks in this country for many years. The electrode tools are substantially identical to each other for the two stages of the tandem blisk except for the required differences in the cutting surfaces thereof for effecting the different configurations of the two stages.

The Bruns machine is set up with one pair of tools for one stage followed by the final machining of that stage. The machine is then re-set up with a second set of electrode tools for the second stage followed by final machining thereof. And, suitable means are used to translate the spindle to align the different stages with the common rotary head.

In this way, the same machine may be used in two independent and separate operations for machining the two stages of the tandem blisk. Since the corresponding setup required for each of the two stages is an elaborate process, the corresponding manufacturing time and costs are correspondingly higher.

These are the particular problems faced by the present applicants, and solved in the tandem blisk ECM apparatus and method recited in the claims under final rejection.

SUMMARY OF CLAIMED SUBJECT MATTER

Claim 1 recites a method for electrochemically machining a tandem blisk 12 as shown in figure 7. The blisk 12 is mounted in a multiaxis electrochemical machine 10 as disclosed at page 6, ll. 1 & 2.

Electrochemical machining is conducted in a first sequence to ECM a first row of blades 18 in one stage of the blisk while mounted in the machine as disclosed at page 6, ll. 26-28.

Electrochemical machining is then conducted in a second sequence to ECM a second row of blades 22 in another stage of the blisk while still mounted in the machine as disclosed at page 7, ll. 4-7.

Method claim 20 recites ECM machining the tandem blisk 12 in a single multiaxis machine 10, which includes ECM machining in a first sequence a first row of blades 18 in one stage of the blisk followed in turn by electrochemically machining in a second sequence a second row of blades 22 in another stage of the blisk

Corresponding electrode tools 26,28 are used in this method, without removing the blisk from the machine between the two sequences, and without re-setting up the tools between the two sequences as additionally disclosed at page 12, ll. 12-19.

Independent claim 11 is the apparatus claim corresponding with method claim 1 which recites means in the form of the spindle 14 and fixture 16 for mounting the blisk as additionally shown in figure 2, and disclosed at page 6, ll. 1 & 2.

Claim 11 further recites means in the form of the electrode first pair 26 for electrochemically machining in a first sequence a first row of blades 18 in one stage of the blisk while mounted in the machine as disclosed at page 6, ll. 26-28; and means in the form of the electrode second pair 28 for electrochemically machining in a second sequence a

second row of blades 22 in another stage of the blisk while still mounted in the machine as disclosed at page 7, ll. 1-4.

Independent claim 18 recites in more detail a multiaxis machine 10 for electrochemically machining a tandem blisk 12 comprising.

This claim recites means 14,16 for mounting the blisk, and a first pair of electrode tools 26 for electrochemically machining in sequence a first row of blades 18 in one stage of the blisk 12 as disclosed above.

Means 38,40,42 are also recited for translating each of the tools in the first tool pair in corresponding first and second axes, and rotating the first tool pair in a third axis as disclosed at page 8, ll. 12-21; and page 12, l. 28 to page 13, l. 3; and shown in figures 3 & 4.

A second pair of electrode tools 28 is also recited for electrochemically machining in sequence a second row of blades 22 in another stage of the blisk as disclosed above.

The recited means 38,40,42 are also effective for translating each of the tools in the second tool pair in corresponding fourth and fifth axes, and rotating the second tool pair in a sixth axis as disclosed above.

Additional means 30 are recited for translating the blisk along a seventh axis in a first direction into the first tool pair for electrochemically machining each of the first row blades 18, and in an opposite second direction into the second tool pair for electrochemically machining each of the row blades as shown in figure 7, and disclosed at page 7, ll. 18-25; and page 13, ll. 2 & 3.

Claims 1-10, 17, and 20 are method claims, and the dependent claims are further discussed in detail hereinbelow.

Claims 11-16, 18, and 19 are apparatus claims, many of which include the means-for elements authorized in Section 112, 6th. para.

The means elements in the independent claims have been identified above.

Dependent claim 12 introduces the means 30 shown in

figures 1 & 7, and disclosed at page 7, ll. 18-25.

Claim 13 introduces the means 52 shown in figure 7 and disclosed at page 14, ll. 9-12.

Claim 14 introduces the means 38,40 shown in figures 3 & 4, and disclosed at page 8, ll. 12-17.

Claim 15 introduces the means 42 shown in figures 3 & 4, and disclosed at page 8, ll. 17-21.

And, claim 19 introduces the means 32 shown in figures 1 & 2, and disclosed at page 7, l. 26 to page 8, l. 8. The means 52 recited in this claim has been disclosed above.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Ground (1) - whether claims 1, 2, 11-15, and 18-20 are unpatentable under 35 USC 103(a) over Bruns et al, Hunter et al, and Mitsuharu.

Ground (2) - whether claims 3-10, 16, and 17 are unpatentable under 35 USC 103(a) over Bruns et al, Hunter et al, Mitsuharu, and the examiner's contention of "Applicant's admission of prior art."

ARGUMENT

The restriction requirement between the method and apparatus claims presented in the first office action dated 08/12/2003 has been overcome.

The Section 102 and 103 rejections presented in the second office action dated 10/13/2004 based on the Bruns reference have been overcome by traverse, without claim amendment.

The Section 103 rejections presented in the third office action dated 01/28/2005 based on the Bruns and additional references have been overcome in part, yet again by traverse without claim amendment.

However, in the fourth and final office action dated 05/23/2005, the examiner has regrouped the claims under the same two Section 103 rejections, copying in most part verbatim his previous contentions, but appearing to acknowledge the merit of Applicants' previous traverse.

For this reason, the phone interview was requested and held in an attempt to resolve any differences of claim interpretation over the applied references, and to amend the claims if warranted, in the hope of avoiding this appeal.

However, the examiner and his supervisor have chosen to maintain the rejections of record, and the reasons therefore, rendering this appeal necessary.

Common to both grounds of rejection is the examiner's use of nonanalogous references Hunter and Mitsuharu. It is not seen how either reference Hunter or Mitsuharu is analogous art; and this position has been previously presented to the examiner.

The scope of the prior art may be determined from applying In re Wood and Eversole, 599 F.2d 1032, 1036, 202 USPQ 171, 174 (CCPA, 1979) [see also MPEP 2141.01(a)]:

> The determination that a reference is from a nonanalogous art is therefore twofold. First, we decide if the reference is within the field of the inventor's endeavor. If it is not, we proceed to determine whether

the reference is reasonably pertinent to the particular problem with which the inventor was involved.

Applicants' field of endeavor is electrochemical machining, a highly specific, complex, and esoteric technology.

This is in stark contrast with the field of endeavor in Hunter which is electrochemical deposition and etching, particularly on "micrometer and nanometer scales."

The computer search for the mere word "electrochemical" has most likely uncovered the Hunter reference, but note that it is not even in the same USPTO classification as the Bruns reference.

This is because the processes are fundamentally different from each other, and utilize fundamentally different apparatus and associated methods.

The main problem confronting the present Applicants is the elaborate set-up procedure required for accurately ECM machining a workpiece, as presented at paras. 10-18, for example.

The problem in Hunter is presented at col. 4, ll. 35+, for example, and is specific to "sub-micrometer spatial resolution...."

There is no nexus between Applicants' problem and the problem, or solution, in Hunter, and the examiner has not shown otherwise.

Similarly, the field of endeavor in Mitsuharu is electricity discharge machining which is clearly not the same as electrochemical machining.

The USPTO may broadly interpret references in typical examination practice, but that interpretation must afford due weight to the technical nature of those references as would be understood by those skilled in the art, the "routineer" according to the examiner, not as based on those without the requisite knowledge or experience.

Furthermore, the problem in Mitsuharu is "machining

cycle time" which is specific to the actual electricity discharge machining of the turbine rotor, which is not relevant to how that apparatus is initially set up for operation.

In an attempt to bolster the use of Hunter and Mitsuharu, the examiner has added to his rejection at the bottom of page 2 by stating that "Hunter et al is considered reasonably pertinent to the problem because Hunter et al relate to simultaneous formation of two different geometries in electrolytic etching (i.e. - machining)."

What problem is that? This is not Applicants' problem as stated above.

How is "simultaneous formation" relevant to Applicants' method and apparatus for ECM machining tandem blisks which does not occur simultaneously? Hunter would therefore teach away.

And, where is the support that the "routineer" would find electrolytic etching the same as machining as the examiner baldly contends; or that such etching is the same as electrochemical machining of blisks?

At page 3 of the office action the examiner also tries to bolster the use of Mitsuharu and baldly contends that "Mitsuharu is considered reasonably pertinent to the problem because Mitsuharu teaches an apparatus capable of performing two types of machining of blades on a single blisk."

However, yet again, the examiner has failed to consider Applicants' problem. The examiner is not permitted to fabricate problems of his choosing, or reinterpret references like Hunter and Mitsuharu for fabricated problems under the Wood case.

In Ex parte Dussaud, 7 USPQ2d 1818 (BPAI 1988), the Board cites the Woods case, among others, and states that:

> We also find that the examiner's characterization of the problem ... is broader than the particular problem with which the appellants were involved. Precise definition of the problem is important in determining whether a reference is from a nonanalogous

> art. Defining the problem too narrowly may result in excluding consideration of relevant prior art. By the same token, defining the problem too broadly, as done here, may result in considering prior art as "analogous" which is inconsistent with real world considerations. [cases omitted].

The Federal Circuit in Monarch Knitting Machinery Corp. v. Sulzer Morat Gmbh, 139 F.3d 877, 45 USPQ2d 1977, 1981 (Fed. Cir. 1998) provides further guidance in applying the Wood test that:

> Defining the problem in terms of its solution reveals improper hindsight in the selection of the prior art relevant to obviousness .... By importing the ultimate solution into the problem facing the inventor, the district court adopted an overly narrow view of the scope of the prior art. It also infected the district court's determinations about the content of the prior art.

The examiner's characterizations of the problems in Hunter and Mitsuharu are clearly not relevant to Applicants' specific problem of elaborate setup operation in an ECM apparatus for machining tandem blisks. Those characterizations have been clearly fabricated in impermissible hindsight, and are overly broad to avoid Applicants' specific problems.

The "simultaneous formation ..." proffered by the examiner for Hunter has no relevance to the setup problem, and indeed disregards that the tandem blisk in not machined simultaneously, but sequentially.

And, what art the "two types of machining" in Mitsuharu, and how are they relevant to Applicants' problem?

The examiner has conspicuously overlooked the express teaching in Mitsuharu of "simultaneously at one step," which simultaneous operation has no relevance to Applicants' problems or claims in which the ECM process is conducted in sequence as well explained in the specification.

At page 8 of the office action, the examiner again attempts to bolster the use of Hunter and Mitsuharu as

relevant art.

The examiner adds that "Mitsuharu is most definitely analogous art because it is related to a similar method of forming a blisk wherein the two types of machining are performed by a single apparatus by using two sets of machining elements (see figures 1-3)."

How is this statement relevant to the Woods test?

Clearly, Mitsuharu is not related to electrochemical machining, nor is it relevant to machining tandem blisks.

And, just as clear, Mitsuharu is not related to Applicants' expressed problems.

The abstract translation of Mitsuharu fails to explain what the two kinds of machining are; and fails to explain how the blades are formed. Most importantly, Mitsuharu expressly states that the electricity discharge machining is nevertheless conducted "simultaneously at one step."

This reference could not be any more different than Applicants' recited claims configured for not simultaneous operation, but sequential operation; and is "most definitely" nonanalogous art notwithstanding the examiner's protestation to the contrary.

The MPEP and case law require the examiner to present evidence in support of claim rejections under Sections 102 and 103. There is no presumption that an examiner has read and understood a non-English reference, or that a partial translation thereof is sufficient in understanding that reference.

The Federal Circuit in Semiconductor Energy Laboratory Co. v. Samsung Electronics Co., 204 F.3d 1368, 54 USPQ2d 1001 (Fed. Cir. 2000), emphasizes the importance of obtaining a complete English translation of a foreign-language reference, in contrast with a partial translation thereof, in evaluating the materiality of the reference in claim examination. MPEP 609C(2) is cited for the proposition that "The examiner need not have the information translated unless it appears necessary to do so."

By rejecting a claim based on a non-English reference, the examiner inherently contends that the reference is material, thusly meeting the threshold requirement for obtaining in the USPTO a complete translation of the reference. MPEP 901.05(d) is then available for the examiner to obtain in the USPTO the necessary translation for then evaluating any relevance it might have in the context of claim examination.

In Ex parte Gavin, the USPTO Board of Appeals (62 USPQ2d 1680, Dec. 2001) indicated that an English Abstract is not often written by the same author as the underlying non-English document, and may be erroneous or misleading and in virtually all cases incomplete. The examiner must provide an English translation of the underlying non-English document where a rejection is based thereon, and the applicant may so request, or petition under Rule 181 for such translation. The Board vacated the examiner's rejection based on the failure to provide and consider an English translation of the of the non-English document.

The examiner's attempt to rely solely on the English abstract of Mitsuharu is without regard to the whole of that reference, and then the examiner attempts to use the lack of teaching thereof to fabricate even the basis to apply Mitsuharu as analogous art, when Mitsuharu is clearly directed to a different process (electricity discharge machining) and different problems (simultaneous machining), and uses a quite different apparatus.

As for the Hunter reference, the examiner further attempts to bolster this reference by making the bald contentions that "Electrolytic etching is a synonym for electrochemical machining." "Thus, Hunter et al is within the field of Applicant's endeavor." "Proof that electrochemical etching is the same as electrochemical machining can be seen in Tyler et al (US 3,755,127) at col. 1, lines 22-28."

This circuitous (il)logic completely disregards the

express and clear teaching of the Hunter reference itself for the microfabrication process disclosed therein, which clearly has no relevance to the electrochemical machining of rotor blisks for gas turbine engines.

The examiner has cited no dictionary for the bald contention that "electrochemical etching is a synonym for electrochemical machining."

As for the newly cited Tyler reference, the examiner is referring to the Background section thereof which expressly states at col. 1, ll. 27 & 28 that "Electrochemical machining is also used for operations such as face milling, deburring, etching and marking."

The etching process is just one different operation in the list, and none of which relate to the Hunter reference or Applicants' claims.

A plain knife can also be used for "etching." Does this mean also that a knife is a "synonym" for electrochemical etching?

The examiner simply jumps to the conclusion that since his computer search of the art has uncovered the plain words "electrochemical," "machining," "deposition," and "etching" that somehow the various processes would be "synonyms" to one skilled in the art.

There is no logic in this, and the examiner's attempt to resurrect the rejections is conspicuous, since he has clearly prejudged the rejections of the claims, and is clearly working in hindsight to support those rejections in any manner possible, without regard to the stringent requirements of the MPEP, and the considerable experience and deference embodied therein.

The examiner has clearly overlooked the substance of the Hunter reference, by instead isolating incidental words found therein by computer searching.

Hunter is quite, quite clear that its field of endeavor is "electrochemical deposition and localized electrochemical etching," col. 1, ll. 6-9; which is specific to

"microstructures." Those microstructures and their microscopic sizes are clearly disclosed in the considerable specification of Hunter.

And, just as clear, the electrochemical etching of those microstructures is clearly not germane to either the ECM machining of the Bruns reference, or the electricity discharge machining of the Mitsuharu reference, and especially the ECM machining process and apparatus recited in Applicants' claims.

Accordingly, the examiner has failed to show how Hunter and Mitsuharu are analogous art, and all of the rejections using these references are without merit; and must be reversed for this reason alone.

Ground 1

Ground (1) - whether claims 1, 2, 11-15, and 18-20 are unpatentable under 35 USC 103(a) over Bruns et al, Hunter et al, and Mitsuharu.

Applicants traverse the rejection of these claims, and request reversal of this rejection.

As indicated above, the examiner has failed to show how Hunter and Mitsuharu are analogous art. This rejection must therefore be reversed for this reason alone.

MPEP 706.02(j) provides the basic requirements which must be provided by the examiner in establishing prima facie obviousness under 35 U.S.C. 103. Four steps are required of the examiner including:

(A) the relevant teachings of the prior art relied upon, preferably with reference to the relevant column or page number(s) and line number(s) where appropriate,

(B) the difference or differences in the claim over the applied reference(s),

(C) the proposed modification of the applied reference(s) necessary to arrive at the claimed subject matter, and

(D) an explanation why one of ordinary skill in the art at the time the invention was made would have been motivated to make the proposed modification.

To establish a prima facie case of obviousness, three basic criteria must be met.

First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings.

Second, there must be a reasonable expectation of success.

Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure.

Citing Ex Parte Clapp, the MPEP places the burden of proof on the examiner to provide some suggestion of the desirability of doing what the inventor has done. "To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.

It is the examiner who must meet this initial burden by applying specific evidence; and clearly the examiner has not met this burden with the unsupported "Therefore" conclusions of obviousness, which fail to meet the stringent "legal motivation" requirements of MPEP ch. 2100.

In re Dembiczak, 175 F.3d 994, 50 USPQ2d 1614 (Fed. Cir. 1999), emphasizes the evidentiary showing required by the USPTO in supporting an obviousness rejection for avoiding impermissible hindsight. The USPTO rejected as obvious claims for a trash bag colored orange in imitation of a pumpkin and decorative face for Halloween. The USPTO cited

many references for creating Jack-O-Lantern bags, including conventional plastic lawn or trash bags. The Federal Circuit reversed the obviousness rejections as hindsight-based, and summarized previous cases:

> Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references.... [In re Rouffet] "the Board must identify specifically . . . the reasons one of ordinary skill in the art would have been motivated to select the references and combine them." [In re Fritch] examiner can satisfy burden of obviousness in light of combination "only by showing some objective teaching [leading to the combination]." [In re Fine] evidence of teaching or suggestion "essential" to avoid hindsight. [Ashland Oil] district court's conclusion of obviousness was error when it "did not elucidate any factual teachings, suggestions or incentives from this prior art that showed the propriety of combination." [Graham] "strict observance" of factual predicates to obviousness conclusion required. Combining prior art references without evidence of such a suggestion, teaching, or motivation simply takes the inventor's disclosure as a blueprint for piecing together the prior art to defeat patentability --- the essence of hindsight. [Interconnect Planning Corp.] "The invention must be viewed not with the blueprint drawn by the inventor, but in the state of the art that existed at the time."
>
> We have noted that evidence of a suggestion, teaching, or motivation to combine may flow from the prior art references themselves, the knowledge of one of ordinary skill in the art, or, in some cases, from the nature of the problem to be solved.... although "the suggestion more often comes from the teachings of the pertinent references...." The range of sources available, however, does not diminish the *REQUIREMENT FOR ACTUAL EVIDENCE. THAT IS, THE SHOWING MUST BE CLEAR AND PARTICULAR....* Broad conclusory statements regarding the teaching of multiple references, standing alone are not "evidence...." In addition to demonstrating the propriety of an obviousness analysis, *PARTICULAR FACTUAL FINDINGS REGARDING THE SUGGESTION, TEACHING, OR MOTIVATION TO COMBINE* serve a number of important purposes, including: (1) clear explication of the position adopted by the Examiner and the Board; (2) identification of the factual disputes, if any, between the applicant and the Board; and (3) facilitation of

> review on appeal. Here, however, the Board did not make particular findings regarding the locus of the suggestion, teaching, or motivation to combine the prior art references....
>
> Nowhere does the Board particularly identify any suggestion, teaching, or motivation to combine the children's art references (Holiday and Shapiro) with the conventional trash or lawn bag references, nor does the Board make specific - or even inferential - findings concerning the identification of the relevant art, the nature of the *PROBLEM* to be solved, or any other factual findings that might serve to support a proper obviousness analysis.
>
> To the contrary, the obviousness analysis in the Board's decision is limited to a discussion of the ways that the multiple prior art references *CAN* be combined to read on the claimed invention. For example, the Board... concludes that the *SUBSTITUTION* of orange plastic for the crepe paper of Holiday and the paper bags of Shapiro would be an *OBVIOUS DESIGN CHOICE*... Yet this reference-by-reference, limitation-by-limitation analysis fails to demonstrate *HOW* the Holiday and Shapiro references teach or suggest their combination with the conventional trash or lawn bags to yield the claimed invention. See Rouffet... noting Board's failure to explain, when analyzing the prior art, "what specific understanding or technical principle... would have suggested the combination." Because we do not discern any finding by the Board that there was a suggestion, teaching, or motivation to combine the prior art references cited against the pending claims, the Board's conclusion of obviousness, as a matter of law, cannot stand. [emphasis added]

INDEPENDENT CLAIMS 1, 11, 18, & 20

The examiner's attempt to combine three disparate references is evidence in and of itself of the non-obviousness of all the claims, because not only has the examiner evaluated these references out of context for isolated teachings thereof, but the examiner has overlooked the fundamental teachings thereof.

The applied reference Bruns was cited by the Applicants, and is expressly identified in Applicants' Background section for the problems therein in ECM machining tandem blisks

The examiner now attempts to reject all of Applicants'

claims using that same Bruns reference cited by the Applicants, with the two disparate references Hunter and Mitsuharu uncovered by the examiner, which are from nonanalogous art as explained above.

Without Applicants' claims and detailed specification as a guide, the examiner, or one skilled in the art, would have no idea where to even begin in evaluating the different teachings of Hunter and Mitsuharu in any way relevant to the Bruns teachings.

Hunter specifically relates to electrodeposition and etching for microfabrication. Mitsuharu relates to electricity discharge machining of a turbine rotor, without even an English translation thereof.

The examiner's hindsight use of these disparate references lacks even basic logic, and is conspicuous in the rote combination thereof based on mere conclusions which attempt to follow the specific, and different, features of the various claims.

Assuming arguendo that Hunter and Mitsuharu are analogous art, the examiner has nevertheless failed to present any technical or logical nexus between these references and Bruns for any combination thereof, and has failed to meet the stringent requirements of the MPEP.

Independent claims 1, 11, 18, and 20 recite method and apparatus for ECM machining a tandem blisk in two sequences while the blisk remains mounted in the machine, without the need to dismount the blisk for successive setup operations, a problem not addressed in any of the three applied references.

Claim 1 recites mounting the tandem blisk 12 in a multiaxis electrochemical machine 10; electrochemically machining in a first sequence a first row of blades 18 in one stage of the blisk while mounted in the machine; and electrochemically machining in a second sequence a second row of blades 22 in another stage of the blisk while still mounted in the machine.

Claim 11 is the corresponding apparatus claim reciting

the means 14,16; means 26; and means 28 for performing these operations.

Claim 18 recites:

means 14 for mounting the blisk;

a first pair of electrode tools 26 for electrochemically machining in sequence a first row of blades 18 in one stage of the blisk 12;

means 38,40,42 for translating each of the tools in the first tool pair in corresponding first and second axes, and rotating the first tool pair in a third axis;

a second pair of electrode tools 28 for electrochemically machining in sequence a second row of blades 22 in another stage of the blisk;

means 38,40,42 for translating each of the tools in the second tool pair in corresponding fourth and fifth axes, and rotating the second tool pair in a sixth axis; and

means 30 for translating the blisk along a seventh axis in a first direction into the first tool pair for electrochemically machining each of the first row blades 18, and in an opposite second direction into the second tool pair for electrochemically machining each of the row blades.

Claim 18 is therefore a species claim in which the two pairs of electrodes 26,28 are mounted relative to the mounted tandem blisk in a seven axis machine of specific combination having no counterpart in the three applied references.

Claim 20 recites a method for electrochemically machining a tandem blisk 12 in a single multiaxis machine 10 comprising electrochemically machining in a first sequence a first row of blades 18 in one stage of the blisk followed in turn by electrochemically machining in a second sequence a second row of blades 22 in another stage of the blisk using corresponding electrode tools 26,28 without removing the blisk from the machine between the two sequences, and without re-setting up the tools between the two sequences.

Note this special ability to machine the two stages of the tandem blisk without removal or repeating the setup

procedure.

The examiner repeatedly admits for these four independent claims the fundamental shortcomings of Bruns, but then attempts to combine Hunter and Mitsuharu without regard to the whole thereof, without regard to the specific teachings thereof, without regard to explaining the proposed modifications of Bruns, and without providing any legal motivation at all.

The examiner's bald statements "for the purpose of increased efficiency and allowing different machined geometries" for claims 1 and 11; "to increase efficiency and allow for multiple, different geometries..." for claim 18; and "would have found it obvious to perform..." for claim 20 are mere hindsight conclusions; are clearly not legal motivation, and lack any technical nexus with the whole teachings of these three disparate references.

Note that in Bruns, a single blisk is shown undergoing ECM machining. At col. 16, ll. 4+, Bruns discloses the use of that machine for tandem blisks, but that machining occurs following a corresponding setup in which the first set of electrode tools must be removed and replaced by a second of electrode tools; and after the machine is yet again setup for the second blisk stage.

This is well explained in Applicants' Background section, as the parent machine over which the present invention is an improvement.

Note further that Hunter expressly teaches a plain substrate 10 having no relevance to the complex blisk, and fails to teach any relevant mounting of that substrate.

Note further that Mitsuharu illustrates a single rotor for which two kinds of machining are conducted simultaneously. There is no tandem rotor disclosed or suggested by Mitsuharu, and the simultaneous machining therein is not relevant to Bruns or Hunter or Applicants' claims.

The examiner has clearly overlooked the whole of

Applicants' recited claims. The recited tandem blisk 12 shown in figure 2 includes two disks 20,24, with each disk having its own row of blades 18,22 which are different in configuration and require different machining by the correspondingly two different sets of ECM electrode tools 26,28.

In each disk 20,24 a multitude of the same blades 18 or 22 are being machined, with that machining being effected sequentially in each disk, and then from disk to disk.

The examiner attempts to use Hunter and Mitsuharu for the "simultaneous" machining disclosed therein, but that simultaneous machining is not relevant to the sequential machining embodied in Applicants' method and apparatus claims; and would clearly appear to teach away therefrom.

The examiner must overlook the whole teachings of the three applied references, and look solely to incidental features thereof if he expects to fabricate any reference at all under the stringent requirements of Section 103. This failure to consider the references in the whole is quite evident from the examiner's cursory and rote contentions of obviousness as presented in the several office actions, including the final office action, now being appealed.

The isolated use of each of the three references without any guide other than Applicants' claims is highly conspicuous. What feature from each reference should be selected, and which should not be selected, and why? How should such features be combined, and what problem is being solved? The examiner has not explained any of this, as required by the MPEP, and the stringent standards thereof.

The examiner attempts to apply Hunter for "multiple electrodes...," but without any nexus with Bruns or Mitsuharu.

The examiner attempts to apply Mitsuharu for "two electrodes are used to electric discharge machine a single part by having independent movement of the two electrodes," but note the examiner's clear change in position in this

regard between the last two office actions.

Consistent the examiner remains in those office actions by emphasizing the "single part" being machined in Mitsuharu. The single part.

The examiner has clearly now failed thrice to provide a suitable nexus with either Bruns or Hunter, all three of which references disclose operations on a single part; not the tandem blisk recited in Applicants' claims.

Does the examiner still contend that the "electricity discharge machining" of Mitsuharu is the same as the "electrochemical machining" in Bruns, or the "electrodeposition or etching" of Hunter? Where is the evidence of this?

It is notoriously well known that these processes are fundamentally different from each other, and the examiner has failed to afford any weight to these fundamental differences in the rush to reject Applicants' claims, now thrice in three different office actions.

The examiner should now appreciate first hand the difficulty in combining references without guidance other than those references themselves. Even with the advantages of having Applicants' claims as the guide, the examiner has continued to be unsuccessful in fabricating plausible rejections when combining references, such as the three disparate references now being applied.

What does Hunter teach to one skilled in the art?

The examiner points to col. 10 for multiple electrodes, as also found at col. 7, ll. 50.

However, where is the figure of multiple electrodes, and how do they cooperate in an apparatus?

The examiner has clearly overlooked the fundamental teaching of Hunter for those multiple electrodes. Col. 10, as used by the examiner, specifically states that those electrodes are used "in parallel" so that "different reactants [can be] simultaneously deposited and etched...."

Notwithstanding the obvious differences between

deposition, etching, and ECM machining; what does parallel mean? What does simultaneous mean? And, how are these teachings to be used in Bruns?

Applicants' claims 1 & 20 recite the ECM machining of the two blade rows 18,22 in sequence while still mounted in the machine.

In sequence is more analogous to in-series, and is the opposite of the in-parallel teaching of Hunter.

In sequence further occurs in successive time; and is the opposite of the simultaneous deposition and etching in Hunter from the multiple electrodes.

At best then, the examiner's proposed combination of the multiple electrodes of Hunter in Bruns would require the use of multiple ECM electrodes in Bruns around the perimeter of the unitary blisk therein "to electrochemically machine two shapes while the part is not removed from the machine."

But, claim 1 does not recite multiple electrodes in parallel for simultaneous ECM as the examiner's use of Hunter would require. The examiner must afford due weight to Applicants' claims as written, and the examiner cannot re-interpret the claims for the purpose of fabricating rejections, as he has clearly done. This is clear error.

And, the examiner has failed to show any nexus between the deposition/etching electrodes of Hunter with the quite different ECM electrodes of Bruns; nor has the examiner shown any nexus between the basic ECM apparatus of Bruns, and the different apparatus of Hunter.

The errors being made by the examiner are further compounded by the additional attempt to use Mitsuharu.

The examiner simply opines that Mitsuharu "teaches ... two electrodes ... to ... electric discharge machine a single part," but this is misleading, and overlooks the very teachings of Mitsuharu itself.

Mitsuharu clearly discloses electricity discharge machining which is not the same or relevant to electrochemical machining, and the examiner has not, and

cannot, show otherwise.

In Mitsuharu, two sets of electrodes 22,23 on their heads 36,37 are used to "simultaneously" machine different portions of the common perimeter of the same rotor.

Note, again, "simultaneously."

How is this relevant to Bruns? In both Hunter, and now Mitsuharu, the examiner requires the simultaneous use of two electrodes in Bruns, but that combination is clearly not relevant to Applicants' invention, including claims 1 & 20 in particular.

Claims 1 & 20 require sequential ECM machining of two different blade rows; sequential.

In the examiner's combination of Bruns, Hunter, and Mitsuharu the one blisk of Bruns would be machined at multiple locations around the perimeter thereof simultaneously.

There are no two rows of blades in Bruns, Hunter, or Mitsuharu; and the examiner has not, and cannot, change the parallel and simultaneous basic teachings of Hunter and Mitsuharu into a sequential or non-simultaneous machining of two different rows of turbine blades, as opposed to the single row in Bruns, the single workpiece in Hunter, and the single rotor in Mitsuharu.

The examiner's contentions regarding independent apparatus claim 11 mostly match the similar contentions for method claim 1, and are equally erroneous for the same reasons presented above.

Note that in para. (2) on page 4, the examiner has overlooked changing his argument of "electrochemically machine" to "electric discharge machine" as found in para. (2) on page 3. This clear error is evidence of the failure of the examiner to consider each reference in the whole, and fairly.

The examiner has prejudged the rejections of the claims, and now is working backward to support that rejection by lifting isolated features from the disparate references

without regard to the basic teachings of those references.

Furthermore, claim 11 is an apparatus claim for which the examiner has afforded no weight to the apparatus features thereof.

Claim 11 recites three different means 14,16; 26; and 28 in combination for mounting the tandem blisk 12 and then ECM machining in sequence the first and second rows of blades 18,22 corresponding to the tandem disks, while the blisk remains mounted. The blisk need not be removed between the sequences to avoid the setup operation problem being solved, because the initial setup is used for both disks.

The Bruns machine has no disclosed configuration for mounting a tandem blisk for sequential machining of two blade rows without removal of the blisk and re-setup, i.e., the very problem being solved by the present Applicants.

Hunter fails to disclose any relevant apparatus for the practice of the microfabrication therein, and the plain substrate 10 disclosed therein has no nexus with the blisk of Bruns, or the tandem blisk recited in claim 11.

And, Mitsuharu clearly shows the mounting of a single turbine rotor for simultaneous machining thereof, without any teaching of its structural capability for mounting a tandem blisk for sequential machining of the two disks thereof.

The examiner simply opines that the three references would have been combined for "increased efficiency and allowing different machined geometries as taught by Hunter et al," but that mere generalization does not meet the legal motivation requirements of the MPEP, and disregards the single workpieces disclosed in all three references being applied.

Independent apparatus claim 18 recites a specific combination of features including the two pairs of electrodes 26,28 having six axes of movement cooperating with movement of the tandem blisk 12 along a seventh axis for machining two rows of blades 18,22.

The examiner admits that Bruns lacks any teaching in

this regard; except Bruns at col. 16 discloses the ECM machining of a tandem blisk in sequential use of the same apparatus.

Why modify the Bruns apparatus when it is already capable of ECM machining tandem blisks in the first instance? The examiner has not explained this.

Instead, the examiner attempts to apply the disparate teachings of Hunter and Mitsuharu, which are nonanalogous art, in a rote and simplistic manner divorced from the complex and esoteric technology associated with each of the three different references being applied.

The examiner merely contends that Hunter and Mitsuharu teach "duplicating the electrode tool ...." But how, and in what combination?

As indicated above, Hunter teaches multiple electrodes, but does not illustrate them or explain how they would be used in any manner relevant to ECM, when the electrodeposition and etching disclosed therein are quite irrelevant, irrespective of the number of electrodes.

And, Mitsuharu clearly discloses the two heads 36,37 of electrodes 22,23 specifically mounted for simultaneous and independent electricity discharge machining of the common rotor. Of what relevance is this teaching to Hunter and Bruns?

At best, Mitsuharu might suggest using two sets of electrode tools in Bruns mounted on opposite sides of the common workpiece in the manner illustrated in Mitsuharu. But, that combination would effect simultaneous ECM machining of the same row of blades in the single or tandem blisk disclosed "to increase efficiency" as the examiner opines.

But, of what relevance to claim 18 is that combination?

The examiner must overlook that claim 18 also recites the seventh axis movement of the blisk in opposite directions for engaging the two tool pairs.

The examiner simply contends that "In order to space the two electrodes apart ... one ... would have ... included a

means for translating the blisk along a 'seventh' axis ..." But, where is the evidence of this, especially when Mitsuharu is to the contrary?

Mitsuharu clearly illustrates two heads 36,37 containing the electrodes 22,23 thereon, which heads are suitably mounted to engage the common rotor from opposite sides, with no teaching whatsoever of any "seventh" axis, or even any need therefor?

The examiner's combination of these three different references is yet again overly simplistic, and fails to afford due weight to Applicants' claims, and fails to consider those references in the whole.

And, the examiner has clearly overlooked the obvious. Why modify Bruns in the first instance, when it already works well enough on single blisks, as well as on tandem blisks?

Any modification of the ECM apparatus in Bruns requires additional complexity and additional cost. Note, that the Bruns reference is specifically identified in Applicants' Background section, and that patent was issued in 1989, and the ECM apparatus disclosed therein has in fact been used for many years.

So, what problem in Bruns is the examiner identifying for any solution being proposed by the examiner?

The examiner is not allowed to use the teachings of Applicants' specification and claims to fabricate modifications of existing patents, like Bruns. The MPEP mandates a stringent analysis, and legal motivation based on evidence.

That a reference could be modified, as the examiner's various rejections require, is not the same as being obvious to modify that reference.

Independent method claim 20 recites a specific method in which the different stages of a tandem blisk are ECM machined in sequence without removing the blisk and without re-setting up the tools.

The examiner's contentions for this claim as presented

at page 6 of the office action are bald conjecture finding no support or evidence in the references being applied; and, indeed, the examiner's contentions are against the evidence of the very references being applied.

As indicated above, Bruns expressly discloses at col. 16 its use in ECM machining tandem blisks; and Applicants' Background section correspondingly discloses the requisite setup required therefor, and the multiple removal of the blisk during that setup, and as required between machining the different stages with different electrode tools.

Hunter discloses the use of multiple electrodes, but no configuration thereof is illustrated, nor is any relevant method disclosed except for simultaneous, parallel use; nor is the electrodeposition and etching of Hunter in any way relevant to the complex ECM machining disclosed in Bruns.

And, Mitsuharu discloses the simultaneous use of the two heads 36,37 of electrodes 22,23.

The examiner has clearly failed to show how the simultaneous and parallel operations in Hunter and Mitsuharu as applied to the Bruns reference in any way meet the sequential machining of two stages without removing the blisk and without re-setting up the tools as recited in claim 20.

Yet further, Mitsuharu clearly teaches that multiple electrodes 22,23 are provided on the corresponding exchangers 26,27 for being exchanged "at an appropriate exchange time" in the electricity discharge machine.

But, Mitsuharu is silent for when that exchange takes place and whether or not the rotor must be removed and whether or not the tools require setup between exchanges.

It would be more likely than not, and the examiner cannot show otherwise, that each time the electrodes 22,23 are changed in Mitsuharu, they would most likely require calibration or suitable setup to ensure accurate machining.

The silence of Mitsuharu does not give the examiner license to baldly interpret therefrom whatever fabrication the examiner finds expedient in rejecting the claims.

The MPEP requires stringent analysis, and evidence, and legal motivation in evaluating claims under Section 103, all of which are lacking in the examiner's rush to reject each and every claim without regard to the whole of each claim, without regard to the merit of each claim, and without regard to the problems being solved or the attendant benefits.

Instead, the examiner applies disparate and nonanalogous references in classic hindsight without regard to the very teachings thereof, without regard to any problems, express or inherent, and taking from those references with the surgical precision of hindsight only so much as desired, with the exclusion of the remainder, to fabricate rejections of Applicants' claims, each and every one, and deny Applicants a fair and objective evaluation of their claims for which they are entitled to commensurate patent protection.

CLAIMS 2 and 12

Claim 2 recites moving the blisk 12 in a first direction into a first pair of electrode tools 26 for electrochemical machining each of the first row blades 18; and then moving the blisk 12 in a different second direction into a second pair of electrode tools 28 for electrochemical machining each of the second row blades 22.

Claim 12 recites the means 30 in the apparatus having this movement capability as introduced at para. 37.

The examiner's contentions regarding claims 2 and 12 are equally erroneous for failing to consider the applied references accurately or in the whole as required by the MPEP.

Claims 2 & 12 require different first and second directions for the movement of the same blisk.

Bruns teaches only a single movement direction for ECM machining the blisk.

Hunter has no relevant teaching in this regard, which is primarily due to the fact that Hunter does not teach any ECM

machining relevant to Bruns.

And, Mitsuharu is quite specific in teaching the two sets of electrodes 22,23 on their corresponding heads 36,37 (figure 3) which electricity discharge machines different portions of the common rotor from opposite sides, without any teaching of any opposite movement of that rotor.

To the contrary, the examiner states, and Mitsuharu discloses, "independent movement of the two electrodes," which means those electrodes move to perform the machining, which is not the same as moving the rotor to perform that machining. How would it even be possible to move the rotor in Mitsuharu in different directions, and at the same time effect simultaneous machining?

If the rotor in Mitsuharu is moved away from one electrode 22, how would that electrode 22 operate to machine the rotor? Simultaneously with the opposite electrode 23?

The examiner simply contends that it would have been obvious to add a second means in Bruns "because the second movement means would allow for easily moving the blisk into position to be machined by the second electrodes."

What does this mean, and where is the evidence of this?

The examiner is expressly applying Hunter and Mitsuharu for the simultaneous machining teaching thereof, which clearly would not be possible in Bruns by moving the blisk in different directions.

The examiner overlooks the teaching in Bruns that the blisk movement is coordinated with the combined movement of the electrode pair to machine the complex, 3D blades have twist and camber, and close spacing or solidity with adjacent blades being machined.

The examiner attempts to use the disparate machining elements of Hunter and Mitsuharu, without regard to their simultaneous use as he contends, in the ECM machine of Bruns which clearly cannot have two pairs of electrode tools operating simultaneously to machine different blades.

The reason appears clear. In Mitsuharu and Hunter the

tools are moved, and the part is stationary.

In Bruns, both the electrode tools and the part are moved in combination to machine the complex blades.

The basic ECM machine disclosed in Bruns is a quite complex, sophisticated, and expensive apparatus for precisely machining complex 3D blades. This, the examiner overlooks in the rush to reject all twenty claims, based on hindsight, without regard to the disparate nature of the nonanalogous art being applied for fabricating rote rejections, now to be resolved by the Board of Appeals.

The examiner simply combines method claim 2 and apparatus claim 12 without regard to the differences thereof, and without regard to the applicable MPEP provisions.

Claim 2 recites a special method, having no counterpart in any of the applied references.

And, claim 12 recites a corresponding apparatus having structural capability and cooperation also having no counterpart in the applied references.

None of those references teach or suggest either the basic method recited in the method claims for ECM machining a tandem blisk in sequence, not simultaneously; nor do any of those references teach or suggest an apparatus having that capability.

CLAIM 13

Claim 13 recites that the second tool pair 28 is offset from the first tool pair 26 in two different planes relative to the blisk 12; and introduces means 52 for translating the blisk between the two offset planes for correspondingly electrochemically machining the first and second blade rows as disclosed at paras. 65, 69, 70, & 72.

The examiner's contentions on page 4 of the office action are conspicuous fabrications having no basis in reality, and no basis in Bruns, Hunter, and Mitsuharu; nor do they comply with the specificity requirements of the MPEP.

Claim 13 recites the two offset machining planes in combination.

Hunter is silent on how multiple electrodes would be configured in the apparatus, and the examiner has not explained any such combination, or provided evidence therefor.

Bruns, at col. 16, explains its use for a tandem blisk; and that use includes the single set of electrodes moving in the single plane disclosed.

And, Mitsuharu clearly discloses the use of the two electrodes 22,23 on their separate heads 36,37 which clearly do not require any offset in two different planes since they are expressly taught for simultaneous machining on opposite sides of the rotor.

Accordingly, the very reference Mitsuharu discloses how the electrodes 22,23 are mounted on opposite sides of the common rotor rendering without merit or without evidence the examiner's simplistic and bald contentions of "bulky," or "difficult," or "interfere."

The examiner's use of the "expected skill of a routineer" is a conspicuous expedient for lack of evidence, and lack of teaching, and disregards the very references being applied by the examiner, without any context and without any problem solving; and further disregards the very skill of that "routineer" as evidenced by the references being applied.

MPEP 2144.03 cautions that it is never appropriate to rely solely on "common knowledge" in the art without evidentiary support in the record, as the principal evidence upon which a rejection is based, citing In re Zurko, 258 F.3d 1379, 1385, 59 USPQ2d 1693, 1697 (Fed. Cir. 2001).

The examiner is clearly attempting to use the expected skill of the routineer for such "common knowledge," since the examiner is unable to cite any evidence in this regard.

No, the examiner is going far beyond the "expected skill of a routineer." The examiner's fabrications are clear

evidence of the non-obviousness of the claims since the examiner has cited no teaching in these references from which the routineer would have found obvious Applicants' claims as specifically recited, and not as now being re-interpreted by the examiner without due weight thereto.

CLAIM 14

Claim 14 introduces means 38,40 for translating each of the electrode tools 26,28 in the first tool pair toward a respective one of the first row blades 18 for electrochemical machining thereof; and means 38,40 for translating each of the electrode tools 28 in the second tool pair toward a respective one of the second row blades 22 without removing the blisk and tools from the machine as disclosed at para. 41.

The examiner's contentions regarding claim 14 are not an accurate interpretation thereof, and disregard the very combinations being recited.

In claim 14, the two electrode pairs are separately translated toward the blades in the two rows without removing the blisk and tools from the machine.

The examiner's contentions of "expected skill," and "bulky," and "interfere," are yet again fabrications without support in any reference, and disregard the whole of those references and the whole of these claims being rejected.

The examiner's contention are not consistent with the applied references.

Bruns specifically teaches the use of a single set of electrodes for machining a tandem blisk, and there is no teaching of "bulky" or "interfere."

Hunter merely discloses multiple electrodes which do not appear to be "bulky" and would not appear to "interfere."

And, Mitsuharu clearly shows two electrodes 22,23 which clearly do not appear to be "bulky," and are conveniently located on opposite sides of the rotor, and therefore do not

appear to "interfere" with anything.

Indeed, Mitsuharu teaches against pairs of electrodes, since it uses separate electrodes 22,23 in the independent machining heads, which electrodes are simply "exchanged with new ones ... at an appropriate exchange time." Note that Mitsuharu does not teach the use of two electrodes 22 at a time, or two electrodes 23 at a time, or the use of the two electrodes 22,23 for machining the same region.

Note further, the examiner's fundamentally incorrect contention of moving electrodes "into communication with a fixed blisk."

Claim 14 expressly recites means 30 for moving the blisk 12 in the two directions in cooperation with the means 38,40 which move the two sets of electrodes 26,28. The blisk in claim 14 is not "fixed" as the examiner erroneously contends.

However, the substrate 10 in Hunter appears fixed; and the rotor disclosed in Mitsuharu also appears to be fixed. Fixed; which yet again teaches away from the examiner's proposed combination of these clearly disparate (and further nonanalogous) references.

CLAIM 15

Claim 15 introduces means 42 for rotating the first tool pair 26 as the blisk is moved in the first direction during electrochemical machining of each of the first row blades 18; and means 42 for rotating the second tool pair 28 as the blisk is moved in the second direction during electrochemical machining of each of the second row blades 22 as disclosed at para. 41.

Claim 15 recites corresponding means 42 for rotating the tool pairs 26,28 in corresponding first and second directions during ECM machining.

The examiner's reference to "col. 5, lines 1-19" of Bruns for claim 15 pertains to the turntable 74 from which the shaft 70 extends. This teaching is not relevant to the

electrode tools of claim 15. And, despite bringing this error to the attention of the examiner, he has not further addressed this error.

However, Bruns does disclose the turntable 56 from which the electrodes 18,20 extend. This is a single turntable which operates in the identical manner for the different stages of a tandem blisk, see col. 16.

The multiple electrodes in Hunter lack any nexus with the electrodes of Bruns.

The singular electrodes 22,23 in Mitsuharu are mounted in corresponding heads 36,37, and therefore teach away from their use in pairs in any manner relevant to Hunter, or Bruns, or claim 15.

It is noted that there are twenty distinct claims for method and apparatus with various features and combinations; yet the examiner has not found allowable even one of those claims; not even with the clear recognition of the fundamentally disparate references being applied, different from each other, and different from Applicants' claims.

This is evidence in and of itself of the examiner's continued failure to afford any weight, let alone due weight, to the different combinations being recited. The examiner's rejections contain rote and bald contentions lacking in requisite analysis and lacking in evidentiary support, and are conspicuous for the selective extractions from the references without regard to the whole thereof; and without regard to any problem solving analysis for which those references might have been combined by those skilled in the art.

However, the three references are so different from each other it does not even appear that they should or could be combined in any manner, let alone in a manner relevant to any of the claims now being rejected by the examiner.

The examiner's hindsight use of these references becomes more and more clear as the examiner rejects even the dependent claims, with the considerable additional features

recited therein based, for example, on the mere contention of "the expected skill of a routineer."

CLAIM 19

Claim 19 depends from claim 18 addressed above, and introduces means 32 for rotating the blisk 12 to sequentially position the blades thereof between the first pair of tools 26 for electrochemical machining thereof, and between the second pair of tools 28 for electrochemical machining thereof; and means 52 for translating the blisk 12 along a longitudinal axis thereof to align the first blade row 18 with the first tool pair 26, and to align the second blade row 22 with the second tool pair 28 as disclosed at paras. 38 and 70.

Claim 19 plainly recites sequential rotation of the blisks for both the first and second tool pairs, and translation of the blisk for alignment with the two sets of electrodes.

The examiner's contentions in this regard are incomplete, erroneous, and fail to meet the stringent MPEP requirements.

In Bruns, there is a single electrode pair, and the shaft 70 is rotated and translated by the elements 74,76 in cooperation therewith.

The examiner's repeated use of the bald contention of "expected skill of the routineer" is without regard to Bruns itself, or Hunter and Mitsuharu being combined therewith.

As indicated above, MPEP 2144.03 prevents the examiner's use of such expected skill as an expedient to reject the claims for lack of evidence.

"Bulky" and "difficult" and "interfere" as the examiner baldly contends are not problems extant in Bruns for which any solution from Hunter and Mitsuharu would have any relevance.

The examiner's contentions are mere hindsight

fabrications, divorced from the reality of Bruns, Hunter, and Mitsuharu.

As indicated above Hunter does not disclose the configuration of the multiple electrodes being used by the examiner.

And, Mitsuharu clearly shows the two heads 36,37 with corresponding electrodes 22,23 thereon configured in the same plane for simultaneously electricity discharge machining of different portions of the same rotor aligned in a single plane, or else the apparatus in Mitsuharu would not operate as intended, or at all.

The examiner again overlooks his basic contention that Hunter and Mitsuharu are being applied for their teaching of simultaneous machining, when simultaneous machining is contrary to the sequential operation recited in Applicants' claims.

Accordingly, any combination being proposed by the examiner must necessarily follow the teachings of Hunter and Mitsuharu in any modification of Bruns, and the examiner is not at liberty to disregard those teachings for the convenience of merely fabricating rejections in hindsight.

The requirements of the MPEP in establishing even prima facie obviousness are specific and stringent, and the examiner has clearly not complied therewith. Instead, the examiner selects disparate, and nonanalogous references, and combines them with bald conclusion without regard to context, and without regard to any problem solving analysis.

The examiner is clearly guided, not by these disparate references, but by Applicants' many claims themselves in selecting from each reference isolated features, and combining them with classic hindsight reconstruction without regard to the highly sophisticated and complex nature of the disparate references.

The examiner's additional reliance on the expected skill of the routineer is an impermissible expedient, and is an express admission of lack of any evidence which poisons all

of the rejections of record.

The examiner invokes the routineer for the overly simplistic combination of the disparate apparatus and methods of the three references being applied; when such routineers would be well educated, and well experienced in their respective fields; and would, without a doubt, not find in these diverse references the problems or solutions being proposed by the examiner in the academic exercise of fabricating rejections before the USPTO, in hindsight no less.

Accordingly, reversal of the rejections of claims 1, 2, 11-15, and 18-20 under Section 103(a) over Bruns et al, Hunter et al, and Mitsuharu is warranted and is requested.

Ground 2

Ground (2) - whether claims 3-10, 16, and 17 are unpatentable under 35 USC 103(a) over Bruns et al, Hunter et al, Mitsuharu, and the examiner's contention of "Applicant's admission of prior art," i.e., AAPA.

Applicants traverse the rejections of these claims and request reversal thereof.

The examiner now relies on his previous use of Bruns, Hunter, and Mitsuharu, which references clearly fail to disclose the invention in the parent claims as required under Section 103 for the reasons presented above.

The examiner's basis for these rejections is mere superficial conjecture on alleged "Applicant's admission of prior art" taken out of context in complete disregard of express teachings of the invention found in the specification.

35 USC 102 enumerates various forms of "prior art," none of which includes the written specification of a patent application being examined.

MPEP 2129 indicates that "prior art" in an application must be so expressly stated.

So, where then has the examiner specifically found in the specification a verbatim reproduction of the rejected claims, and the admission that those claims are AAPA as the examiner contends?

Virtually all inventions are combinations of old or conventional elements. Yet it is the combination being claimed which must be examined for patentability, not its individual elements.

The specification clearly points out the individual elements recited in the claims, how they are combined, and the benefits therefrom. Where does the examiner find in the specification that such combination claims are "AAPA?"

The examiner's use of the specification clearly takes isolated descriptions out of context in complete disregard of the express combination of elements, and in disregard of the whole invention being recited in each claim.

CLAIMS 3 and 17

Claim 3 recites a method of setting up the machine 10 for machining the blisk 12 by:

electrochemically machining in the machine sample blades in two stages of a tandem blisk sample 12s;

removing the blisk sample from the machine;

inspecting the sample blades in the two stages of the blisk sample to determine dimensions thereof;

comparing the inspected dimensions with specified dimensions for the blisk;

repeating as necessary the setup sequence for the blisk sample until the inspected dimensions are within the specified dimensions; and

then mounting the blisk 12 in the machine for sequentially machining the first and second rows of blades to the specified dimensions.

This special method is illustrated in figure 7, and described at paras. 49 et seq.

Method claim 17 is similar in the process, but includes the specific apparatus recited in claims 11 & 12 addressed above.

Claims 3 & 17 therefore recite a method for setting up the machine specifically configured for ECM machining of the tandem blisk.

The examiner merely jumps to the "therefore" conclusion without any analysis or evidence whatsoever.

Paras. 12-14 of the Background section are clearly not any admission that the prior art is relevant to a two-stage ECM machine or its operation.

Those paragraphs and the Bruns reference itself clearly support the setup procedure being repeated independently for each of the two stages of the tandem blisk, and the examiner has provided no evidence to the contrary.

The examiner is not allowed to use Applicants' own teachings to reject Applicants' own claims; that would be impermissible boot strapping, and the examiner's guise of using the isolated teachings of Bruns, whether they be found in the Bruns reference itself, or in paras. 12-14 of Applicants' Background section does not transform those teachings into anything different or new for tandem blisks.

It is interesting to note that the examiner must necessarily apply the Bruns reference, since that reference describes the parent machine over which the present invention is an improvement, and which reference is specifically identified in the Background section.

However, the examiner conspicuously disregards, and affords no weight whatsoever, to the specific problems confronting the present applicants in using the ECM apparatus of that specifically identified Bruns reference.

No, instead, the examiner merely opines throughout his arguments that the routineer would possess certain knowledge and certain reason to combine the disparate references as fabricated by the examiner himself, without regard to the Bruns reference itself, without regard to Applicants'

description thereof in the Background section, and without due regard to the disparate references Hunter and Mitsuharu being combined with Bruns.

The examiner is combining Hunter for use with tandem blisks, but Hunter is silent in this regard, and Hunter is nonanalogous art and is not technically relevant to the setup procedure recited in claims 3 & 17.

The examiner is also combining Mitsuharu for tandem blisks, but Mitsuharu is quite express about using the two electrodes 22,23 simultaneously on the common rotor without any teaching whatsoever of removing that rotor at any time during any setup thereof.

The examiner simply opines that "it would have been obvious ... to have operated the two electrode pair machine in the same manner ...," and what is that "same manner?"

That "same manner" is setting up the tandem blisk first for one stage, then ECM machining that one stage since this is what Bruns and paras. 12-14 of Applicants' Background section disclose.

The examiner may then argue that the teachings of Hunter and Mitsuharu could be combined, but that combination as repeatedly proffered by the examiner is for the simultaneous machining of two blades at a time in the same rotor stage of the blisk. In this way, according to the examiner, "increased efficiency" would be obtained.

Next, after completing ECM machining of the first stage, the ECM machine would then have to be yet again setup for machining the second stage. And, how would that be done?

"In the same manner," which requires machining of the second stage, or sample, and multiple removals thereof for inspecting the dimensions, and when that is complete ECM machining of the second stage would be accomplished.

And, according to the examiner, that second stage could enjoy the "increased efficiency" attributable to combining Hunter and Mitsuharu for machining two blades at a time in that same second stage.

So, "in the same manner" being proposed by the examiner still requires multiple removal of the blisk or sample during setup in the sequence of operations disclosed by Bruns and paras. 12-14 for independently ECM machining the two different stages of the tandem blisk.

Yet, the examiner has overlooked this "routineer" interpretation of Bruns and paras. 12-14, and has overlooked the express features recited in claims 3 & 17 which enjoy the synergy of effecting the setup simultaneously even though the final ECM machining is not effected simultaneously, but in sequence.

Compare the simultaneous, parallel teachings of Hunter.

Compare, also the simultaneous, and equally parallel, teachings of Mitsuharu.

Where then is the examiner's evidence to disregard these teachings, and simply jump to the conclusion that the examiner's mere, unexplained combination of the structure and methods of Bruns, Hunter, Mitsuharu would somehow suggest to the "routineer" to disregard those very teachings, and conduct the setup of the tandem blisk in the single sequence recited in claims 3 & 17?

There is no such evidence, and the examiner's rejection of claims 3 & 17 is therefore without merit.

CLAIMS 4 and 8

Claim 4 recites the further features of offsetting the second tool pair 28 from the first tool pair 26 in two different planes relative to the blisk 12; and translating the blisk between the two offset planes for correspondingly electrochemically machining the first and second blade rows 18,22 as shown in figure 7 and disclosed at para. 72.

Claim 8 recites similar features, but depends from the longer chain of claim 7, and therefore includes a larger combination of elements than found in claim 4, overlooked by the examiner in combining the two claims together.

It is noted that the examiner combined these two claims in the first ground in the previous office action, then moved these two claims to the second ground after Applicants successfully traversed the rote rejections thereof.

On page 7 of the final office action, the examiner has repeated verbatim his unsubstantiated contentions regarding these two claims as found in the previous office action, and without regard to the correspondingly necessary modification thereof in the second ground versus the first ground of rejection.

This is yet another expedient to reject these claims without affording due consideration or due weight thereto.

Claims 4 and 8 both recite the two offset machining planes in combination.

Hunter is silent on how multiple electrodes would be configured in the apparatus, and the examiner has not explained any such combination, or provided evidence therefor.

Bruns, at col. 16, explains its use for a tandem blisk; and that use includes the single set of electrodes moving in the single plane disclosed.

And, Mitsuharu clearly discloses the use of the two electrodes 22,23 which clearly would not, and could not, have any offset in two different planes or the required simultaneous machining would be rendered inoperative.

Recall, the examiner, himself, is applying Mitsuharu for the express teaching of simultaneous machining. That simultaneous machining necessarily requires the turbine rotor in Mitsuharu, as well as in Bruns, to remain in a single plane; not two planes.

Accordingly, the very reference Mitsuharu discloses how the two electrodes 22,23 are mounted relative to the common rotor rendering without merit or without evidence the examiner's simplistic and bald contentions of "bulky," or "highly difficult," or "interfere."

To the contrary, Mitsuharu clearly illustrates the

convenient location of the two electrodes 22,23 on opposite sides of the common rotor; this is not bulky, or highly difficult, nor provides any interference whatsoever.

Where then is the examiner's logic, and evidence to support the rote rejection?

The examiner's use of the "expected skill of a routineer" is another conspicuous expedient for lack of evidence, and lack of teaching, and disregards the very references being applied by the examiner, without any context and without any problem solving; and further disregards the very skill of that "routineer" as evidenced by the references being applied.

No, the examiner is going far beyond the "expected skill of a routineer." The examiner's fabrications are clear evidence of the non-obviousness of the claims since the examiner has cited no teaching in these references from which the routineer would have found obvious Applicants' claims as specifically recited, and not as re-interpreted by the examiner without due weight thereto.

CLAIM 5

Claim 5 recites translating each of the electrode tools 26,28 in the first tool pair toward a respective one of the first row blades 18 for electrochemical machining thereof; and translating each of the electrode tools 28 in the second tool pair toward a respective one of the second row blades 22 without removing the blisk and tools from the machine as shown in figures 3, 4, and 7, and as disclosed at para. 41.

Yet again, the examiner has simply moved this rejection from first ground in the previous office action to the second ground in the final office action, without addressing the additional requirements for this claim needed in the second ground.

The examiner's repeated contentions regarding claim 5 are not an accurate interpretation thereof, and disregard the

very combinations being recited.

In claim 5, the two electrode pairs are separately translated toward the blades in the two rows without removing the blisk and tools from the machine.

The examiner's repeated contentions of "expected skill," and "bulky," and "interfere," are yet again fabrications without support in any reference, and disregard the whole of those references and the whole of these claims being rejected.

The examiner's contentions are not consistent with the applied references.

Bruns specifically teaches the use of a single set of electrodes for machining a tandem blisk, and there is no teaching of "bulky" or "interfere."

Hunter merely discloses multiple electrodes which do not appear to be "bulky" and would not appear to "interfere."

And, Mitsuharu clearly shows two electrodes 22,23 quite conveniently located on opposite sides of the rotor, which clearly do not appear to be "bulky" and do not appear to "interfere" with anything.

Indeed, Mitsuharu teaches against pairs of electrodes, since it uses separate electrodes 22,23 in the independent machining heads, which electrodes are simply "exchanged with new ones ... at an appropriate exchange time."

CLAIM 6

Claim 6 recites rotating the first tool pair 26 as the blisk is moved in the first direction during electrochemical machining of each of the first row blades 18; and rotating the second tool pair 28 as the blisk is moved in the second direction during electrochemical machining of each of the second row blades 22 as also disclosed at para. 41.

Claim 6 therefore recites that the two tool pairs 26,28 are rotated as the blisk itself is moved in corresponding first and second directions during ECM machining.

The examiner's reference to "col. 5, lines 1-19" of Bruns for claim 6 yet again pertains to the turntable 74 from which the shaft 70 extends. This teaching is not relevant to the electrode tools of claim 6, now twice brought to the attention of the examiner for suitable correction without avail.

However, Bruns does disclose the turntable 56 from which the electrodes 18,20 extend. But, that is a single turntable which operates in the identical manner for the different stages of a tandem blisk, see col. 16.

The multiple electrodes in Hunter lack any nexus with the electrodes of Bruns.

The singular electrodes 22,23 in Mitsuharu are found in the corresponding heads, and therefore teach away from their use in pairs in any manner relevant to Hunter, or Bruns, or claim 6.

CLAIMS 7 and 16

Claim 7 recites that:

the second row blades 22 have different size and configuration than the first row blades 18;

the first tool pair 26 are complementary with the first row blades for electrochemical machining thereof;

the second tool pair 28 are complementary with the second row blades for electrochemical machining thereof; and

the second tool pair 28 are translated and rotated upon translation of the blisk in the second direction in a manner corresponding with translation and rotation of the first tool pair 26 as the blisk is translated in the first direction as disclosed at paras. 31 et seq.

Claim 16 recites the corresponding apparatus claim including the different features of apparatus claim 15 from which it depends.

As for the examiner's contentions on page 8 of the office action, para. 15 of Applicants' Background section is

not any admission relevant to claims 7 and 16, and does not give the examiner license to jump to his unsupported conclusion based on the combination of Bruns, Hunter, and Mitsuharu which, as explained above, are quite different from each other in structure, method, operation, and purpose.

Claims 7 & 16 recite not only different blade size, but complementary electrode tools, which, of course, would have different size; and corresponding translation and rotation of the different tool pairs in the different first and second directions.

In Hunter, the multiple electrodes may have different sizes, but are nevertheless operated in parallel and simultaneously "to optimize fabrication rates."

In Mitsuharu, the multiple electrodes 22,23 would appear to be identical because they are operated simultaneously on the same rotor to electricity discharge machine the repetitive features therein so that the "machining cycle time ... can be shortened."

In claims 7 and 16, the tool pairs have different size but are not operated simultaneously as the examiner's combination of Bruns, Hunter, and Mitsuharu would require.

And, that combination of Bruns, Hunter, and Mitsuharu would include matching heads 36,37 operating simultaneously on the same rotor without any need to rotate and translate the electrodes 22,23 in different directions, or relative to any movement of the rotor itself, which does not appear to be taught in Mitsuharu.

"In order to independently optimize the processing of each row of blades" as the examiner contends clearly is not legal motivation, and clearly overlooks the fundamental differences and teachings of these disparate references.

What problem is being solved by such independent optimization? And, where is any evidence of this problem in any one of the three references which the examiner attempts to combine?

The examiner has not addressed this in the rush to

reject the claims.

CLAIMS 9 and 10

Claim 9 recites the blisk sample being the same as the tandem blisk 12; and claim 10 recites the blisk sample 12s being different therefrom.

Claims 9 & 10 therefore recite the use of the same or different blisk sample, in combinations from their common parent apparatus claim 8, not addressed by the examiner in his mere reference to para. 12 of the Background section.

Why has the examiner taken from para. 12 only this isolated teaching to the exclusion of the remainder of this para. 12.

Para. 12 also states that an "elaborate setup procedure" is required for using the ECM apparatus to machine blisks.

Para. 15 explains the additional complexity of the ECM process for tandem blisks.

Paras. 16 & 17 explain the setup process for the tandem blisks which requires corresponding setup for each of the two stages.

So, why has the examiner taken para. 12 out of context? Because of impermissible selective hindsight reconstruction, plain and simple.

The examiner's simplistic comments at page 8 for rejecting claims 9 & 10 fail to comply with the requisite MPEP analysis, and showing of evidence, and lack any motivation at all, let alone legal motivation.

Accordingly, withdrawal of the rejection of claims 3-10, 16, and 17 under Section 103(a) over Bruns et al, Hunter et al, Mitsuharu, and "Applicant's admission of prior art" is warranted and is requested.

Response to Arguments

On pages 8 et seq. of the final office action, the

examiner responds to Applicants' previous traverse.

In para. 4a, the examiner attempts to bolster his position that Hunter and Mitsuharu are analogous art, but these contentions have been traversed above.

It is quite clear that the examiner is distorting the express teachings of these two references, and is also distorting the interpretations of those references by those correspondingly skilled in the disparate art thereof, which art is clearly not the same as each other; nor the same as the ECM machining art found in Bruns, or corresponding to Applicants' claims.

The examiner's emphatic protestation is telling.

In para. 4b the examiner attempts to defend the nexus between the references on mere examiner argument, and without support in the MPEP, or with logic.

The substance of the examiner's contentions in para. 4b have been addressed above. It is noted, however, that the examiner here opines that Hunter and Mitsuharu teach the "concept of adding a second set of machining electrodes," but "concepts" do not support rejections under Section 103; see MPEP ch. 2100.

And, those references clearly do not teach the use of "second sets."

Each electrode 11 disclosed in Hunter is a unitary electrode, not a set.

Each electrode 22,23 disclosed in Mitsuharu is also a unitary electrode, not a set.

As for the examiner's bald contention that "the apparatus does not have to be re-setup for machining the second geometric shape," there is simply no evidence in these references to support this statement.

These bald contentions are based on hindsight, and neither Hunter nor Mitsuharu disclose any analogous setup procedure since that is not relevant to their teachings.

Instead, the examiner looks to the silence of these references, and "finds" in that silence a teaching clearly

not supported therein.

In para. 4c the examiner addresses the Hunter reference in the preamble thereof, but then refers to "figures 1-3 of Mitsuharu" which does not appear to be consistent.

At the top of page 3 of the office action, the examiner himself clearly states that "Hunter et al relate to simultaneous formation of two different geometries...." This is a fundamental basis for the examiner's many rejections.

And, at col. 7, ll. 51+, Hunter clearly teaches several electrodes 11 used in parallel, for parallel fabrication, effected simultaneously.

As for Mitsuharu, figures 1-3 thereof illustrate an apparatus with two electrodes 22,23 on the two heads 36,37, with the two electrode exchangers 26,27.

In the English translation Abstract, Mitsuharu expressly states machining "a turbine rotor simultaneously at one step."

There can be no doubt of these clear teachings of Hunter and Mitsuharu; but the examiner adds further ambiguity of his use of the three references in para. 4c.

The examiner attempts to proffer Hunter for the simplistic contention of "multiple electrodes" without regard to the minuscule size thereof, or how they are used, or what structure they affect.

The examiner simply opines that the Hunter electrodes could be used for "savings in time" for machining "the tandem blisk of Bruns et al or Mitsuharu." How is that?

The minuscule electrodes of Hunter could not possibly machine the requisite amount of material in the blisk of Bruns or the rotor of Mitsuharu; that would take an eternity since those electrodes 11 are not made for ECM machining turbine blisks.

And, Bruns expressly teaches the series use of the ECM electrodes to machine tandem blisks, and Mitsuharu is silent on tandem blisks, and applies solely to the single rotor disclosed therein.

The examiner then attempts to disavow his own fundamental contentions regarding the "simultaneous" capabilities of Hunter and Mitsuharu by invoking the First National City Bank case, and simply arguing that "Whether the two electrodes are used at the same time or in series is not relevant as it has been held that splitting one step into two was obvious."

This, the examiner simply argues without clearly having read the case, or attempting to apply the facts thereof, or the holdings in context.

This case is a trademark case, and as indicated above in the interview summary, the examiner has applied it from a list found in his group, without regard to the merits thereof.

The examiner has now replaced that case with the General Foods Corp case identified in the interview summary.

Yet again, the examiner has not attempted to apply the facts of that case or the legal rationale to the present application and claims. This is clear error, and clear evidence of the examiner's failure to afford due weight to express claim features.

Claim 1 in the General Foods case recites a method of preparing a dry animal food. The district court held that the "order of cooling and coating with a fat and gravy former" was not limited in that order and that "splitting one step into two does not avoid infringement."

How is this relevant to Applicants' claims, and the references being applied by the examiner?

And, what is the "one step [being] split into two" in the applied references?

Nevertheless, the examiner must completely disregard the very references Bruns, Hunter, and Mitsuharu which he is attempting to combine for their teachings, when now trying to invoke the General Foods case. This is quite remarkable, and further evidence of the examiner's use of hindsight to reject all twenty claims without due consideration or due weight to

those claims, and the disparate references being applied.

As indicated above, Bruns clearly discloses how a blisk is machined, and the individual stages of a tandem blisk would be machined no differently, except for the setup problem.

That is the very problem being addressed by the Applicants' and being solved by their claims.

In Hunter, different problems and different solutions are taught, with the use of an individual electrode 11 having no relevance to the disparate electrodes in Bruns, which electrodes 11 can be duplicated and operated simultaneously in parallel.

And in Mitsuharu, the two electrodes 22,23 are operated simultaneously for the express advantages disclosed therein, and relied on by the examiner.

How is it consistent for the examiner after presenting nine pages of arguments, to change position in para. 4c?

"Not relevant," the examiner now contends for the use of two electrodes "at the same time or in series?"

The examiner's additional contentions in para. 4d are pure argument divorced of any logic or evidence.

It is the examiner who is applying Hunter; and Hunter teaches the parallel use of multiple electrodes 11 on a fixed substrate. So would not parallel electrodes in Bruns also be so configured?

It is also the examiner who is applying Mitsuharu; and Mitsuharu teaches the simultaneous use of the two electrodes 22,23 on the two heads 36,37 on opposite sides of the fixed rotor. So would not duplicate heads in Bruns be so configured?

In para. 4e the examiner invokes MPEP 2144.04 for the rearrangement of parts in claims 4, 8, 13 which recite offsetting the two tool pairs 26,28.

How is offsetting the electrodes a rearrangement of parts?

Bruns clearly discloses a single set of electrodes,

whereas Applicants' claims require the addition of a second set. An addition of a second set is not the rearrangement of the one set found in Bruns.

And, to the contrary, Applicants' have indeed disclosed "new and unexpected results" of the offset configuration, as found at para. 72 which reduces the overall complexity of a very, very complex machine for which the examiner fails to afford due weight in his rush to reject, and re-reject the claims.

And, MPEP 2144.04 cites In re Japikse. Claim 3 in In re Japikse recited a hydraulic power press including means to start the pressing operation thereof. The applied reference included all of the features in this claim arranged in the same manner, except for a differently located starting switch. The court held that there would be no invention in shifting the starting switch in the applied reference to a different position since the operation of the device would not thereby be modified.

Where is any analogous "starting switch" found in Bruns for which MPEP 2144.04 would apply?

Note, that the examiner is combining three references to address Applicants' claims; three references is evidence not of mere rearrangement of parts, but the express need to combine features from multiple references in an attempt to support the rejection.

No, the belated attempt by the examiner in para. 4e to bolster the rejection, is, instead, additional evidence of the examiner's predisposition to reject all the claims on any reason, irrespective of the logic, or lack of logic.

In para. 4f the examiner opines that Bruns would have been modified for increased efficiency.

What increase in efficiency? Where is there any teaching that Bruns is not efficient as it is?

Where is any teaching in Bruns of a problem of efficiency for which the examiner's proposed solution has merit?

The examiner is clearly using solely Applicants' own disclosure to fabricate the rejections of the various claims, without regard to a fair evaluation of each of the three references individually and in the whole.

The examiner simply opines that "Hunter et al teaches this." Where is that teaching?

Where does Hunter teach that the microfabrication process therein could be used in the Bruns apparatus for removing material in bulk?

The examiner disregards the fundamental differences between Hunter and Bruns. The small electrodes 11 are neither sized nor configured to machine blades on a tandem blisk.

The small electrodes 11 are indeed configured to process a substrate, which is clearly held stationary so that the etching may be effected in parallel thereon.

Assuming that there were two substrates in Hunter, would not those two substrates be etched with the electrodes 11, yet again in parallel as taught therein.

Why has the examiner taken Applicants' teachings and solutions to fabricate rejections, without regard to the very teachings of the disparate references being applied?

The examiner has overlooked the MPEP requirements for evaluating references in the whole, and based on problems found therein.

Any examiner can readily fabricate reasons to combine references, especially when guided by Applicants' well written description as mandated by Section 112. This, the present examiner has done, without regard to the very references being applied.

Without Applicants' claims as the guide the examiner, and one skilled in the art, would not know which features to select and which to disregard, and how to combine disparate references.

As for para 4g, there can be no confusion in Bruns between part 54 and part 24 if that reference is read with

the due care required under the thoroughness standard of Rule 104. There is simply no excuse for overlooking the fundamental features of this, or any reference, in the blind rush to reject claims, without regard to identified evidence.

Applicants are duty bound to identify errors made by the examiner, and errors made by the examiner, for whatever reason, merely poison the various rejections being proffered by the examiner, and raise into issue the fair, objective, and complete evaluation of those claims as required by the various MPEP provisions, of which there are a great many.

It is quite clear from the protracted prosecution of this application, and from the phone interview conducted with the examiner, that the examiner, and his supervisor, have taken a strong stand to maintain the rejection of all twenty claims of record.

All twenty claims; which claims recite a substantial improvement over the very Bruns reference cited by the Applicants', and now being used by the examiner in an attempt to support unwarranted rejections of each and every claim, despite the significant features and benefits thereof.

It is also quite surprising that in the several office actions of record, and under the thoroughness standard of Rule 104, the examiner has been unable to cite any additional references relevant to the electrochemical machining of workpieces, and in particular for turbine blades and disks.

Any such references still available in the prior art would clearly show the complexity and sophistication of ECM machining, and would additionally support not only the nonanalogous nature of Hunter and Mitsuharu, but would be evidence against the examiner's attempt to use and combine those references with Bruns.

The comprehensive review of this application expected of the Board should clearly recognize the various errors made by the examiner in finding facts and evidence, and applying that evidence to the claims being rejected.

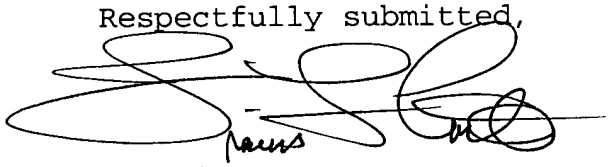
The MPEP is admirable in its thoroughness and

specificity in the stringent requirements of establishing rejections under Section 103 which requires evaluating each and every claim, and each and every reference in the whole, and finding legal motivation, not merely hindsight reasons, to combine references in a manner specifically relevant to the several claims.

The examiner has clearly failed to establish even prima facie rejections of all twenty claims; and the various remarks presented by the examiner in the various office actions are evidence of the hindsight application of the references without regard to the whole thereof, without regard to problem solving, and without regard to the requirements found in the MPEP, in particular in chapter 2100 thereof.

For these exemplary reasons, reversal of all the various rejections is warranted, and allowance of all claims 1-20 is warranted and is requested.

Respectfully submitted,



Date: 22 August 2005

Francis L. Conte, Attorney
Registration No. 29,630

6 Puritan Avenue
Swampscott, MA 01907
Tel: 781-592-9077
Fax: 781-592-4618

Attachment:

Claims Appendix

CLAIMS APPENDIX

Claims on appeal:

1. A method for electrochemically machining a tandem blisk comprising:

mounting said blisk in a multiaxis electrochemical machine;

electrochemically machining in a first sequence a first row of blades in one stage of said blisk while mounted in said machine; and

electrochemically machining in a second sequence a second row of blades in another stage of said blisk while still mounted in said machine.

2. A method according to claim 1 further comprising:

moving said blisk in a first direction into a first pair of electrode tools for electrochemical machining each of said first row blades; and

moving said blisk in a different second direction into a second pair of electrode tools for electrochemical machining each of said second row blades.

3. A method according to claim 2 further comprising setting up said machine for machining said blisk by:

electrochemically machining in said machine sample blades in two stages of a tandem blisk sample;

removing said blisk sample from said machine;

inspecting said sample blades in said two stages of said blisk sample to determine dimensions thereof;

comparing said inspected dimensions with specified dimensions for said blisk;

repeating as necessary said setup sequence for said blisk sample until said inspected dimensions are within said specified dimensions; and

then mounting said blisk in said machine for sequentially

machining said first and second rows of blades to said specified dimensions.

4. A method according to claim 3 further comprising:

offsetting said second tool pair from said first tool pair in two different planes relative to said blisk; and

translating said blisk between said two offset planes for correspondingly electrochemically machining said first and second blade rows.

5. A method according to claim 3 further comprising:

translating each of said electrode tools in said first tool pair toward a respective one of said first row blades for electrochemical machining thereof; and

translating each of said electrode tools in said second tool pair toward a respective one of said second row blades without removing said blisk and tools from said machine.

6. A method according to claim 5 further comprising:

rotating said first tool pair as said blisk is moved in said first direction during electrochemical machining of each of said first row blades; and

rotating said second tool pair as said blisk is moved in said second direction during electrochemical machining of each of said second row blades.

7. A method according to claim 6 wherein:

said second row blades have different size and configuration than said first row blades;

said first tool pair are complementary with said first row blades for electrochemical machining thereof;

said second tool pair are complementary with said second row blades for electrochemical machining thereof; and

said second tool pair are translated and rotated upon translation of said blisk in said second direction in a manner corresponding with translation and rotation of said first tool

pair as said blisk is translated in said first direction.

8. A method according to claim 7 further comprising:

offsetting said second tool pair from said first tool pair in two different planes relative to said blisk; and

translating said blisk between said two offset planes for correspondingly electrochemically machining said first and second blade rows.

9. A method according to claim 8 wherein said blisk sample is the same as said tandem blisk.

10. A method according to claim 8 wherein said blisk sample is a different part than said tandem blisk.

11. A machine for electrochemically machining a tandem blisk comprising:

means for mounting said blisk;

means for electrochemically machining in a first sequence a first row of blades in one stage of said blisk while mounted in said machine; and

means for electrochemically machining in a second sequence a second row of blades in another stage of said blisk while still mounted in said machine.

12. A machine according to claim 11 further comprising:

means moving said blisk in a first direction into a first pair of electrode tools for electrochemical machining each of said first row blades; and

said moving means being configured for additionally moving said blisk in a different second direction into a second pair of electrode tools for electrochemical machining each of said second row blades.

13. A machine according to claim 12 wherein:

said second tool pair is offset from said first tool pair

in two different planes relative to said blisk; and

further comprising means for translating said blisk between said two offset planes for correspondingly electrochemically machining said first and second blade rows.

14. A machine according to claim 13 further comprising:

means for translating each of said electrode tools in said first tool pair toward a respective one of said first row blades for electrochemical machining thereof; and

means for translating each of said electrode tools in said second tool pair toward a respective one of said second row blades without removing said blisk and tools from said machine.

15. A machine according to claim 14 further comprising:

means for rotating said first tool pair as said blisk is moved in said first direction during electrochemical machining of each of said first row blades; and

means for rotating said second tool pair as said blisk is moved in said second direction during electrochemical machining of each of said second row blades.

16. A machine according to claim 15 wherein:

said second row blades have different size and configuration than said first row blades;

said first tool pair is complementary with said first row blades for electrochemical machining thereof;

said second tool pair is complementary with said second row blades for electrochemical machining thereof; and

said second tool pair is translatable and rotatable upon translation of said blisk in said second direction in a manner corresponding with translation and rotation of said first tool pair as said blisk is translated in said first direction.

17. A method of setting up said machine according to claim 12 comprising:

electrochemically machining in said machine sample blades in two stages of a tandem blisk sample;

removing said blisk sample from said machine;

inspecting said sample blades in said two stages of said blisk sample to determine dimensions thereof;

comparing said inspected dimensions with specified dimensions for said blisk;

repeating as necessary said setup sequence for said blisk sample until said inspected dimensions are within said specified dimensions; and

then mounting said blisk in said machine for sequentially machining said first and second rows of blades to said specified dimensions.

18. A multiaxis machine for electrochemically machining a tandem blisk comprising:

means for mounting said blisk;

a first pair of electrode tools for electrochemically machining in sequence a first row of blades in one stage of said blisk;

means for translating each of said tools in said first tool pair in corresponding first and second axes, and rotating said first tool pair in a third axis;

a second pair of electrode tools for electrochemically machining in sequence a second row of blades in another stage of said blisk;

means for translating each of said tools in said second tool pair in corresponding fourth and fifth axes, and rotating said second tool pair in a sixth axis; and

means for translating said blisk along a seventh axis in a first direction into said first tool pair for electrochemically machining each of said first row blades, and in an opposite second direction into said second tool pair for electrochemically machining each of said row blades.

19. A machine according to claim 18 further comprising:

means for rotating said blisk to sequentially position said blades thereof between said first pair of tools for electrochemical machining thereof, and between said second pair of tools for electrochemical machining thereof; and

means for translating said blisk along a longitudinal axis thereof to align said first blade row with said first tool pair, and to align said second blade row with said second tool pair.

20. A method for electrochemically machining a tandem blisk in a single multiaxis machine comprising electrochemically machining in a first sequence a first row of blades in one stage of said blisk followed in turn by electrochemically machining in a second sequence a second row of blades in another stage of said blisk using corresponding electrode tools without removing said blisk from said machine between said two sequences, and without re-setting up said tools between said two sequences.